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REMARKS

The response filed on January 19, 2001 was completely responsive to the outstanding Office Action mailed on July 19, 2000. This supplemental response merely cancels a claim, amends some claims, adds a claim, and provides a more detailed explanation why the claimed invention is novel and nonobvious over the prior art.

This supplemental response cancels Claim 9, amends Claims 1 and 10-20, and adds new Claim 21. (Support for new Claim 21 can be found in, inter alia, the originally filed version of Claim 1.) Upon amendment, the application will have two independent claims (Claims 1 and 21) and a total of twenty claims (Claims 1-9 and 11-21). Therefore, no fees for excess claims are due.

The January 19, 2001 response was prepared by my colleague because I was ill at that time. Unfortunately, my colleague apparently did not understand that the Examiner had already renumbered some of the claims, as summarized in item 3 of the outstanding July 19, 2000 Office Action; and, therefore, the January 19, 2001 response attempts to renumber the claims again.

To avoid further confusion regarding the renumbered claims, the Examiner is respectfully requested to ignore all of the amendments to Claims 10-21 that are set forth in the January 19, 2001 response. That is, the Examiner is respectfully requested to ignore the claim amendments that begin on line 8 of page 4 of the January 19, 2001 response and end on line 3 on page 8 of the

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January 19, 2001 response.

As recommended by the Examiner in item 3 and in the last paragraph of item 6 of the outstanding July 19, 2000 Office Action, this supplemental response amends Claims 12, 14, and 17 to correct the dependencies of these subclaims.

As suggested by the Examiner in item 4 of the outstanding Office Action, the January 19, 2001 response and this supplemental response amend the specification and claims to change the term "system" to "composition."

To overcome the objection set forth in item 5 of the outstanding Office Action, the January 19, 2001 response shortens the abstract. Support for shortening the abstract can be found in, inter alia, the originally filed version of the abstract.

As recommended by the Examiner in the first sentence of the second paragraph in item 6 of the outstanding Office Action, this supplemental response amends Claim 1 to change "obtainable" to "obtained."

In the second sentence of the second paragraph in item 6 of the outstanding Office Action, the Examiner raises a question regarding whether or not the surface of the support must have hydroxyl groups in order to react with the alumoxane. It is believed that the surface of the support need not have hydroxyl groups in order to react with the alumoxane.

In the third sentence of the second paragraph in item 6 of the outstanding Office Action, the Examiner raises a question regarding the definition of "m." To address this question regarding the definition of "m," the January 19, 2001 response amends formulas II and III to be consistent with $m = 2, 3, \text{ or } 4$.

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In item 9 of the outstanding Office Action, the Examiner rejects Claims 1-7 and 10-19 for allegedly being anticipated by or obvious in view of European Patent Document No. 0 802 203 (hereinafter referred to as the "Hidalgo-Llinas document"). In item 10 of the outstanding Office Action, the Examiner rejects Claims 1-7 and 10-19 for allegedly being obvious over European Patent Document No. 0 372 414 (hereinafter referred to as the "Antberg EPO document") in view of European Patent Document No. 0 206 794 (hereinafter referred to as the "Welborn document"). The Applicants respectfully traverse these rejections for the reasons set forth below.

Amended independent Claim 1 calls for a metallocene compound having a formula I, II, or III; and new independent Claim 21 calls for a metallocene compound having formula I, II, or III. Formulas I, II, and III each require the following group: $-R^I OSiR^{II}_3$, (hereinafter referred to as the "novel group"). This novel group apparently is responsible for the excellent performance of the catalytic compositions claimed in independent Claims 1 and 21. Specifically, this novel group is believed to be responsible for the excellent performance of the claimed catalytic compositions in catalyzing polymerization reactions without fouling the reactor and in producing polymers having excellent morphologies.

By contrast, the Hidalgo-Llinas document does not disclose or suggest a metallocene compound having the above-mentioned novel group; and, more particularly, the catalysts disclosed in Examples 6-12 on pages 10 and 11 of the Hidalgo-Llinas document do not include the above-mentioned novel group. For example, lines 27-37 on page 4 of the Hidalgo-Llinas document disclose a metallocene compound having the formula (III), which includes the following groups: $(L_1)_m$, D_n , and A_g . Significantly, $(L_1)_m$, D_n , and A_g do not

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include the above-mentioned novel group. For example, $(L_1)_m$ and D_n may each include a group having the formula (IV) (see lines 25-35 on page 5 of the Hidalgo-Llinas document), but formula (IV) is not equivalent to the above-mentioned novel group because formula (IV) does not include an oxygen atom, which is required by the above-mentioned novel group, and because formula (IV) requires Y (a halogen, $NR_{11}R_{12}$, or a hydroxyl group (see line 43 on page 5 of the Hidalgo-Llinas document)), which is not found in the above-mentioned novel group. Similarly, A_g includes a group having the formula (V) (see lines 49-57 on page 5 of the Hidalgo-Llinas document), but formula (V) is not equivalent to the above-mentioned novel group because formula (V) does not have three R^{II} groups, as required by the above-mentioned novel group.

Independent Claims 1 and 21 each call for metallocene compounds having the above-mentioned novel group. As a result, the catalytic compositions claimed in Claims 1 and 21 can catalyze a polymerization reaction without fouling the reactor and can produce polymers having excellent morphologies even if only a small quantity of an alkylaluminum (such as TIBA) is added to the polymerization reactor (see Examples 27-35 on pages 57-60 of the Applicants' specification). By contrast, because the catalytic compositions disclosed or suggested in the Hidalgo-Llinas document are different from the catalytic compositions claimed in Claims 1 and 21, catalyzing a polymerization reaction with the catalytic compositions disclosed in the Hidalgo-Llinas document requires adding relatively large quantities of costly alumoxane to the polymerization reactor in order to carry out the polymerization (see Examples 13-24 on pages 11-13 of the Hidalgo-Llinas document, which discloses feeding relatively large quantities of costly alumoxane (MAO) to the polymerization reactor). Independent Claims 1 and 21 are novel and nonobvious over the Hidalgo-Llinas document because the Hidalgo-Llinas document does not teach or

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suggest the catalytic compositions claimed in Claims 1 and 21.

Independent Claims 1 and 21 are also nonobvious over the Antberg EPO document in view of the Welborn document because the cited documents do not teach or suggest the claimed catalytic compositions.

(The Antberg EPO document is in German; and the undersigned attorney does not speak German. Therefore, rather than discussing the Antberg EPO document, the following discussion refers to Antberg et al.'s U.S. Patent No. 5,071,808 (hereinafter referred to as the "Antberg U.S. patent"), which is believed to be an English-language equivalent of the Antberg EPO document because the Antberg U.S. patent and the Antberg EPO document both claim priority to German Patent Application No. 3840772 (filed December 3, 1988).)

Independent Claims 1 and 21 each claim heterogeneous catalytic compositions obtained by reacting an inorganic support with an alumoxane and subsequently supporting a metallocene compound thereon. The metallocene compound includes the above-mentioned novel group, which is believed to facilitate fixation of the metallocene compound to the alumoxane-treated support. The prior does not teach or suggest the claimed heterogeneous catalytic compositions because the prior art does not teach or suggest that metallocene compounds having the above-mentioned novel group should be supported on an alumoxane-treated support.

For example, the Antberg U.S. patent discloses various metallocene compounds, but the Antberg U.S. patent does not teach or suggest that these metallocene compounds should be supported on an alumoxane-treated support. In fact, Antberg et al. (see column 1, lines 11-28) seek to produce a metallocene catalyst that is insoluble in hydrocarbon solvents and that does not include a

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support. Antberg et al. seek a metallocene catalyst that is insoluble in hydrocarbon solvents because soluble metallocene catalysts cannot be used in many existing industrial plants, which generally are designed to use insoluble heterogenous catalyst systems (see column 1, lines 15-21).

Furthermore, Antberg et al. seek a metallocene catalyst that does not include a support because:

- (1) the Antberg patent (see column 1, lines 22-25) teaches that metallocene catalysts in which a zirconocene or titanocene component and an aluminoxane are applied onto a silicate support are not very active; and
- (2) the Antberg patent (column 1, lines 25-28) teaches that such supported metallocene catalysts are undesirable since the catalyst components are not firmly anchored to the support and, thus, can be extracted during polymerization.

To avoid the drawbacks associated with soluble metallocene catalysts and to avoid the drawbacks associated supported metallocene catalysts, Antberg et al. prepared a heterogeneous metallocene catalyst that is insoluble in hydrocarbon solvents and that does not include a support. Antberg et al.'s heterogeneous metallocene catalyst is prepared by reacting a soluble metallocene compound with a poly(methylhydrogensiloxane), wherein the reaction produces a heterogeneous metallocene catalyst that precipitates from a hydrocarbon solvent and, thus, is insoluble in the hydrocarbon solvent (see column 4, lines 51-61; and column 5, lines 27-36). Because Antberg et al.'s heterogeneous metallocene catalyst is insoluble in hydrocarbon solvents, Antberg et al.'s heterogeneous metallocene catalyst avoids the above-described

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drawbacks that are associated with soluble metallocene catalysts. Furthermore, the insolubility of Antberg et al.'s heterogeneous metallocene catalyst means that a support is not needed to make the catalyst insoluble in hydrocarbon solvents. Antberg et al.'s heterogeneous metallocene catalyst does not include a support because Antberg et al.'s heterogeneous metallocene catalyst is insoluble in hydrocarbon solvents even without a support and because the Antberg U.S. patent teaches that supported metallocene catalysts have significant drawbacks, as a described above.

In item 10 in the outstanding official action, the Examiner argues that it would have been obvious to deposit Antberg et al.'s heterogeneous metallocene catalyst onto a support in accordance with the teachings of the Welborn document. The Applicants respectfully traverse this argument because there is no teaching or suggestion in the prior art that Antberg et al.'s insoluble heterogeneous metallocene catalyst should be deposited onto a support; and nothing would motivate someone to attempt to deposit Antberg et al.'s insoluble heterogeneous metallocene catalyst onto a support because Antberg et al.'s heterogeneous metallocene catalyst is insoluble in hydrocarbon solvents without the support. In fact, the Antberg U.S. patent teaches away from depositing Antberg et al.'s insoluble heterogeneous metallocene catalyst onto a support because Antberg et al. recognized that a supported metallocene catalyst has significant drawbacks, as a described above.

In addition, the Welborn document does not teach or suggest depositing Antberg et al.'s insoluble heterogeneous metallocene catalyst onto a support. The Welborn document (see page 6, lines 6-8) teaches that hydrocarbon-soluble metallocenes and alumoxanes may be deposited onto a support material; and, more specifically, the Welborn document (see page 6, lines 20-31) teaches that the metallocenes and the alumoxanes are dissolved in one or more inert

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solvents (such as the hydrocarbon solvent toluene) in order to deposit the metallocenes and the alumoxanes onto the support material. Thus, all of Welborn's supported metallocene catalysts (Catalysts A through D on line 28 of page 15 through line 6 on page 17) were prepared by dissolving the metallocenes in a hydrocarbon solvent (namely toluene) so that the metallocenes could be deposited onto the support material. The Welborn document discloses how to deposit a hydrocarbon-soluble metallocene onto a support material, but the Welborn document does not disclose or suggest depositing onto a support material a metallocene compound that is insoluble in a hydrocarbon solvent. As noted above, Antberg et al.'s heterogeneous metallocene catalyst is insoluble in hydrocarbon solvents; and because the Welborn patent does not teach or suggest depositing onto a support material an insoluble metallocene compound, the Welborn document does not teach or suggest depositing onto a support material Antberg et al.'s insoluble heterogeneous metallocene catalyst.

Independent Claims 1 and 21 each claim heterogeneous catalytic compositions obtained by supporting a metallocene compound having the above-mentioned novel group on an alumoxane-treated support. The above-mentioned novel group facilitates fixation of the metallocene compound to the alumoxane-treated support. The prior art does not teach or suggest the claimed heterogeneous catalytic compositions because the Antberg U.S. patent and the Welborn document do not teach or suggest supporting metallocene compounds having the above-mentioned novel group on an alumoxane-treated support. And because the prior art does not teach or suggest the claimed heterogeneous catalytic compositions, Claims 1 and 21 are nonobvious over the prior art.

Subclaims 2-9 and 11-20 are nonobvious over the prior art because the prior art fails to teach or suggest the particular features claimed in these subclaims; and Subclaims 2-9 and 11-20 are

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further nonobvious over the prior art because these subclaims are directly or indirectly dependent on a nonobvious base claim (Claim 1).

Finally, this supplemental response amends the decimal numbers in Table 1 on pages 62 and 63 of the specification to replace commas with decimal points in accordance with U.S. practice.

It is submitted that the application is in condition for allowance. Allowance of the application at an early date is solicited.

The Applicants are filing herewith an Information Disclosure Statement (IDS). Before issuing the next Office Action on the merits, the Examiner is respectfully requested to consider on the merits the IDS that is enclosed herewith.

Our records indicate that the Examiner has not yet acknowledged considering on the merits the Information Disclosure Statement (IDS) that was filed via first-class mail on February 10, 2000. Therefore, before issuing the next Office Action on the merits, the Examiner is respectfully requested to consider on the merits the February 10, 2000 IDS, which was timely filed before the issuance of the first Office Action on the merits. If the Examiner does not have a copy of the February 10, 2000 IDS in his file, the Examiner is respectfully requested to contact the undersigned attorney, who would be pleased to send to the Examiner a copy of the February 10, 2000 IDS.

The January 19, 2001 response amends Claim 1 and various other claims (e.g., Claims 2-8); and this supplemental response cancels Claim 9, amends Claims 1 and 10-20, and adds new Claim 21. The amendments, cancellation, and additions described in the preceding sentence were done to claim to improve the wording of the claims

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and were not done to overcome the prior art and were not done to overcome the rejections or objections set forth in the outstanding Office Action. The amendments, cancellation, and additions described in the first sentence of this paragraph shall not be considered necessary to overcome the prior art and shall not be considered necessary to overcome the rejections or objections set forth in the outstanding Office Action.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to Deposit Account No. 12-0415. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 C.F.R § 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed; and the petition fee due in connection therewith may be charged to deposit account No. 12-0415.

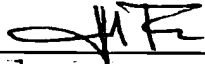
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